

Application No. 10/693,108
Amendment dated 12/07/2006 responding to Office Action dated 06/20/2006

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AMENDMENTS

In the Claims

Please amend claim 31 as follows. The following listing of claims will replace all prior versions and listings of claims in the application.

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LISTING OF THE CLAIMS

- 1 1. (Original) An electromagnetic transducer comprising:
2 a motor structure including a magnetic air gap;
3 a voice coil disposed within the magnetic air gap; and
4 a diaphragm coupled to the voice coil, wherein the diaphragm has an overall mass density
5 lower than 0.01g/cm^3 .
- 1 2. (Original) The electromagnetic transducer of claim 1 wherein the diaphragm has an overall
2 mass density lower than 0.005g/cm^3 .
- 1 3. (Original) The electromagnetic transducer of claim 1 wherein the diaphragm comprises a
2 nanoporous material.
- 1 4. (Original) The electromagnetic transducer of claim 3 wherein the nanoporous material
2 comprises at least one of aerogel, solgel, and nanocomposite material.
- 1 5. (Original) The electromagnetic transducer of claim 3 wherein the diaphragm further
2 comprises a skin.
- 1 6. (Original) The electromagnetic transducer of claim 5 wherein the skin encapsulates the
2 entire diaphragm.
- 1 7. (Original) The electromagnetic transducer of claim 5 wherein the skin comprises at least one
2 of a sputtered layer, a chemical vapor deposition layer, and a vacuum deposited layer.
- 1 8. (Original) The electromagnetic transducer of claim 5 wherein the skin comprises at least one
2 of metal, plastic, and oxide.
- 1 9. (Original) The electromagnetic transducer of claim 1 wherein the diaphragm comprises one
2 of a sphere, a hemisphere, a less than hemispherical section of a sphere, a silo shape, and a filled
3 cone shape.

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- 1 10. (Original) The electromagnetic transducer of claim 1 further comprising:
2 a bobbin coupled to the diaphragm and to the voice coil.
- 1 11. (Original) The electromagnetic transducer of claim 10 further comprising a skin
2 encapsulating the diaphragm.
- 1 12. (Original) The electromagnetic transducer of claim 11 wherein the skin further encapsulates
2 the bobbin.
- 1 13. (Original) The electromagnetic transducer of claim 12 wherein the skin further encapsulates
2 the voice coil.
- 1 14. (Original) The electromagnetic transducer of claim 10 wherein the bobbin comprises an
2 integral part of the diaphragm and is constructed of aerogel.
- 1 15. (Original) The electromagnetic transducer of claim 1 configured as an audio tweeter and
2 wherein the diaphragm comprises a dome shape.
- 1 16. (Original) The electromagnetic transducer of claim 1 configured as a compression driver.
- 1 17. (Original) The electromagnetic transducer of claim 1 configured as a microphone.
- 1 **18.** (Original) An electromagnetic transducer comprising:
2 a motor structure;
3 a suspension component coupled to the motor structure; and
4 a diaphragm coupled to the suspension component, wherein the diaphragm comprises
5 more than 50% by volume a nanoporous material.
- 1 19. (Original) The electromagnetic transducer of claim 18 wherein:
2 the diaphragm comprises more than 75% by volume a nanoporous material.
- 1 20. (Original) The electromagnetic transducer of claim 19 wherein:
2 the diaphragm comprises more than 90% by volume a nanoporous material.

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1 21. (Original) The electromagnetic transducer of claim 20 wherein:

2 the diaphragm comprises more than 95% by volume a nanoporous material.

1 22. (Original) The electromagnetic transducer of claim 21 wherein:

2 the diaphragm comprises more than 99% by volume a nanoporous material.

1 23. (Original) The electromagnetic transducer of claim 18 wherein:

2 the nanoporous material comprises aerogel.

1 **24.** (Original) A tweeter audio speaker comprising:

2 a motor structure having a magnetic air gap;

3 a diaphragm including a substantially solid dome of nanoporous material; and

4 a voice coil coupled to the diaphragm and disposed within the magnetic air gap.

1 25. (Original) The tweeter audio speaker of claim 24 further comprising a skin coupled to the
2 dome.

1 26. (Original) The tweeter audio speaker of claim 25 further comprising a bobbin coupling the
2 dome to the voice coil.

1 27. (Original) The tweeter audio speaker of claim 26 wherein the skin is further coupled to the
2 bobbin.

1 28. (Original) The tweeter audio speaker of claim 27 wherein the skin is further coupled to and
2 overlies the voice coil.

1 29. (Original) The tweeter audio speaker of claim 28 wherein the skin comprises at least two
2 layers of skin.

1 30. (Original) The tweeter audio speaker of claim 26 wherein the bobbin comprises nanoporous
2 material and is monolithic with the dome.

1 31. (Currently Amended) The tweeter audio speaker of claim ~~24~~ 25 wherein the skin
2 comprises at least one of metal, plastic, and oxide.

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1 32. (Original) The tweeter audio speaker of claim 31 wherein the skin is formed on the dome by
2 at least one of sputtering, chemical vapor deposition, vacuum deposition, laminating, dipping,
3 and painting.

1 33. (Original) The tweeter audio speaker of claim 24 wherein the dome has a shape comprising
2 one of spherical, hemispherical, sub-hemispherical, silo-shaped, and filled cone.

1 34. (Original) The tweeter audio speaker of claim 24 wherein the nanoporous material
2 comprises at least one of aerogel, solgel, and nanocomposite material.

1 **35.** (Original) An audio speaker comprising:

2 a motor structure having a magnetic air gap;

3 a diaphragm including a plastic and a nanoporous material distributed within the plastic
4 so as to be substantially encapsulated by the plastic; and

5 a voice coil coupled to the diaphragm and disposed within the magnetic air gap.

1 36. (Original) The audio speaker of claim 35 wherein the diaphragm comprises at least 10%
2 nanoporous material by volume.

1 37. (Original) The audio speaker of claim 36 wherein the diaphragm comprises at least 25%
2 nanoporous material by volume.

1 38. (Original) The audio speaker of claim 37 wherein the diaphragm comprises at least 50%
2 nanoporous material by volume.

1 39. (Original) The audio speaker of claim 35 wherein the diaphragm comprises a plurality of
2 particles of nanoporous material.

1 40. (Original) The audio speaker of claim 39 wherein the nanoporous material comprises more
2 than 1,000 particles of nanoporous material each less than 1 cubic millimeter in volume.

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1 41. (Original) The audio speaker of claim 35 wherein the nanoporous material comprises a
2 sheet, and the plastic comprises a plurality of layers sandwiching the sheet of nanoporous
3 material.

1 42. (Original) The audio speaker of claim 35 wherein the plastic comprises polypropylene.

1 43. (Original) The audio speaker of claim 42 wherein the nanoporous material comprises
2 aerogel.

1 44. (Original) The audio speaker of claim 35 wherein the nanoporous material comprises a
2 sheet, and the plastic comprises a plurality of layers sandwiching the sheet of nanoporous
3 material.

1 **45.** (Original) An improvement in an audio speaker, the audio speaker comprising,
2 a motor structure including a magnetic air gap; and
3 a diaphragm assembly including,
4 a bobbin,
5 a voice coil coupled to the bobbin and disposed within the magnetic air gap,
6 a suspension component coupling the diaphragm assembly to the motor structure,
7 and
8 a diaphragm coupled to the bobbin;
9 wherein the improvement comprises the diaphragm being comprised of a substantially
10 translucent plastic filled with particles of a substantially translucent nanoporous material.

1 46. (Original) The improvement in the audio speaker of claim 45, wherein the improvement
2 further comprises the substantially translucent plastic comprising polymethylpentene.

1 47. (Original) The improvement in the audio speaker of claim 46, wherein the improvement
2 further comprises the substantially translucent nanoporous material comprising aerogel.

1 48. (Original) The improvement in the audio speaker of claim 47, wherein the improvement
2 further comprises at least some of the particles having a tint added to them.

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- 1 49. (Original) The improvement in the audio speaker of claim 48, wherein the improvement
- 2 further comprises the tint comprising a vapor deposited layer of metal.